



# Practical Design

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## Overview and Background

- Practical Design Background
  - Other States
  - NCHRP Synthesis
- Practical Design at FDOT
- FHWA Performance Based Practical Design
- Complimentary Initiatives



## What is Practical Design

“A project development philosophy whereby projects are **scoped** to meet the **purpose and need**, avoiding the desire to arbitrarily bring the facility up to a maximum level for all design elements. ...using the savings for more projects”

NCHRP Synthesis 443



## Evolution of Practical Design

- Began in Missouri – 2005
- 6 states Documented Policy
- 2012 NCHRP Synthesis Project
  - How states defined & implemented
  - Barriers & Lessons Learned
  - Practical Design vs Traditional
  - Relationships to other initiatives
  - Application of design exceptions



## “Practical” States

- Missouri – 2005 Design
- Idaho – 2007 Solutions
- Kentucky – 2008 Solutions
- Kansas – 2009 Improvements
- Oregon – 2009 Design
- Utah – 2011 Design



## Common Themes

### Among all 6 Practical Design states

- Initiated program from a need to maximize existing funds
- Focused effort around a clearly defined “Purpose & Need” Statement
- Developed guidance or policy for Practical Design



## Other States

### NCHRP Synthesis 443

- States considering Practical Design Policy

- Alabama
- Florida
- New York
- Washington
- Wisconsin



## FDOT Practical Design

- “Practical” States @ January 2012 Executive Board
- List of 3R optional items – March 2012
  - Items eliminated from all resurfacing projects
  - Items to remain in resurfacing projects
  - Items to remain in resurfacing projects at Engineer’s discretion
- Central Office reviews of Interstate 3R projects – Spring 2012
- Project Management Memo – August 2012
- Practical Design Policy Statement – June 2014
- Practical Design Handbook – November 2014



## 3R Optional Items



## CO Reviews – Interstate RRR

- All Interstate RRR projects subject to Central Office review
  - Request plans around 90% (Phase III)
  - Review is comprehensive: Roadway, Structures, Signing & Pavement Marking, Signalization, etc.
  - Not based solely on the List of Optional Items – all items included in the design are subject to review
  - Process typically took about 2-3 months.
  - Cost savings vs. Cost to redesign
- Timing is not ideal – goal is to implement during project scoping



## CO Reviews – Interstate RRR

- Typical Questions or Comments
  - Project “need” is not immediately clear
    - Response should demonstrate need based on engineering data
    - “Because the manual says so” does not demonstrate a need
  - Was a variation/exception considered?
  - Were alternative improvements considered?
    - Mitigation strategies
  - The Department is willing to save even minor amounts of money



## Results – Interstate RRR

- Cost Savings
  - Lettings May 2012 – October 2013
  - Reviewed 15 Interstate RRR projects
  - \$4.2 million in cost savings
  - Approximately 6.5% of the projects' cost
- “Put more product out on the street”



[illegible]

- List of Optional Items to review on 3R projects
- Target 10% Construction Cost Savings
- Document decisions, rational and savings in memo for each evaluated 3R project
- Submit 3R project review memo's to Production Support Office



# Project Management Memo

- Review Checklist
  - Completed for every RRR project starting with September 2012 letting through March 2013
  - Submitted to Central Office Production Support
  - Optional items being included in RRR projects should be supported with engineering observations



## PART 1 – To Be Eliminated from All Resurfacing Projects

N/A	Not Included	Included	To Be Eliminated
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Milling and resurfacing of travel lanes in areas where the only deficiency is due to ride, typically due to manholes and utilities. [We have ride only projects that can be programmed to address manhole/utility issues.]
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Placing FC-5 in median crossovers of multi-lane, high-speed facilities (By policy, this practice is currently optional. Districts choose to pave crossovers to avoid complaints after construction.)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Minor cross slope correction (see new PPM for flexibility)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Minor super-elevation correction (see new PPM for flexibility)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Continuous post-and-beam concrete bridge railing three-beam retrofits (when bridge railing has never been hit)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Upgrade existing guide rail to picket rail when drop-off hazard is less than 5'-0" (continuous picket rail OK if drop-off hazard varies and at least 60" in height at some locations)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Milling and resurfacing paved side streets beyond the return radius/right-of-way line unless needed for harmonization of public side streets (but not greater than 50').
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Barrier selection for aesthetic not safety reasons (e.g., choosing to install barrier wall instead of guardrail because it is more aesthetically pleasing. In addition, guardrail reduces g-forces experienced by drivers when impacted.)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Rock bags for inlet protection in curb and gutter areas (see new Erosion and Sediment Control Manual)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Cross drain extensions that are beyond shoulder standards but within the clear zone and have no significant crash history (determined by District Safety Engineer)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Side drain end treatments outside the clear zone when not needed for a hydraulic purpose
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Removing nonstandard drainage structures and slope protection that are still functioning
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Side drain safety upgrades (within 30' of each other, replacing with pipe and a ditch bottom inlet)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Replacing functional ditch pavement
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Upgrade of functioning pedestrian detectors (push-buttons) with newer models (unless we are touching the ped heads/ped poles, then ADA kicks in)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Upgrades at driveway flares when not required
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Construction of curb ramps in areas without sidewalk
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Enhanced landscaping
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Patterned pavement crosswalks (unless the funding and maintenance of these are the local agency's responsibility)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Project-wide sign replacement without evaluation
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Repairing concrete spalls at curb inlets, MIES, headwalls, etc. (unless these create a hazard themselves)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mowing and litter removal on pavement only projects
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Paving gore areas with FC-5



## Results

- Cost Savings 9/12 – 3/13
  - 47 projects submitted checklists
  - Total initial cost: \$195.5 million
  - Cost savings: \$3.9 million (2.0%)
- Individual Project Statistics
  - 23 of 47 reported no cost savings
  - Individual project savings ranged from \$1,112 to \$693,993
- Practical Design needs to be considered during scope development rather than at final plans



## FHWA Guidance on Design Exceptions

“We encourage State DOT’s and local agencies to consider using design exceptions as a useful tool to achieve a design that balances project and user needs, performance, cost, environmental implications, and community values. State DOT’s or local authorities must evaluate, approve and, document design exceptions.”

Effective Oct 1, 2012, All NHS projects under Map-21 must meet FHWA approved standards or receive approved Design Exceptions.





## FDOT Practical Design

- Reviewed NCHRP report
- Reviewed policies of all 6 documented states
- Developed FDOT Policy – Approved 6/3/2014
- Developed Guidelines for 3R projects – 11/2014



## Common Features

- Properly defined scope of work
- Focused on achieving “Purpose & Need”
- Encourage use of Design Exceptions & Variations
- Develop & evaluate design alternatives
- Encourage “outside the box” thinking



## Common Features

- Consider surroundings of each project
- Consider life cycle costs
- Do not shift burden to maintenance
- Collaborative solutions



## Practical Design Policy



... The Department will maximize the value received of every dollar spent by evaluating multiple design options, encouraging group collaboration, considering all costs, analyzing bold and innovative techniques, and ensuring that all improvements fulfill the purpose and need of the project while supporting the overall vision of the corridor.

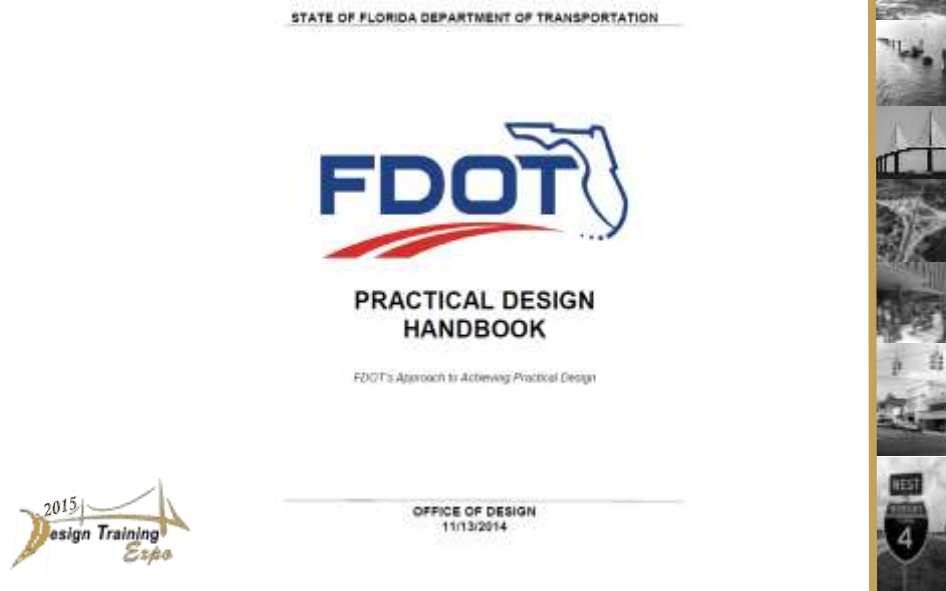
We maximize the value received for every dollar spent by evaluating multiple design options, encouraging group collaboration, considering all costs, analyzing bold and innovative techniques, and ensuring that all improvements fulfill the purpose and need of the project while supporting the overall vision for the corridor.



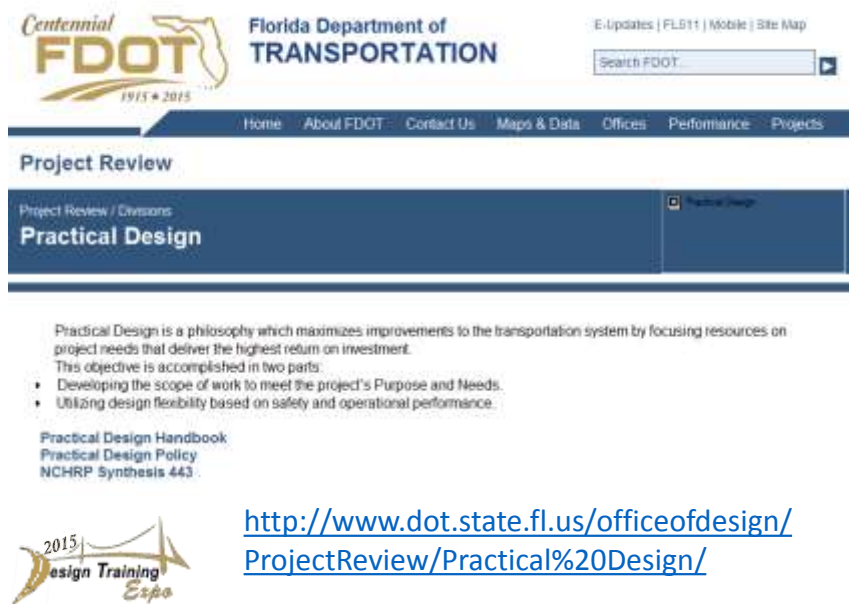
*Ananth Prasad*  
Ananth Prasad, P.E.  
Secretary



# Practical Design Handbook



# Practical Design Web Site



## FHWA Study

- Many states developed own version
- Interviewed 8 States
  - Missouri
  - Minnesota
  - Utah
  - Washington
  - Oregon
  - Kentucky
  - Kansas
  - Indiana



## FHWA Study - Common Elements

- Concise project objectives
- Geometrics based on need, not standards
- Maximize return-on investment
- Program savings returned to improve system
- No compromise to safety



## FHWA Study - Benefits

- Utilize flexibility in the engineered highway design- solutions
- Can limit impacts to environment & ROW
- May encourage additional use of analyses to verify decisions



## FHWA Study - Concerns

- Over-emphasis on short-term needs & cost savings
- Decisions may not be based on objective analysis of data
- May result in elimination of project elements or compromise commitments



## FHWA Study - Recommendation

Develop Practical Design Approach grounded in **performance-management** and focused on system enhancement

- Encourage use of flexibility
- Use performance analysis to support decision-making
- Project level decisions consider transportation system



## Performance Based Practical Design

“PBPD can be articulated as modifying a traditional design approach to a “design up” approach where transportation decision makers exercise **engineering judgment** to build up the improvements from existing conditions to **meet project and system objectives.**”

<http://www.fhwa.dot.gov/design/pbpd/>



## Complimentary Initiatives

- Complete Streets
- Context Sensitive Solutions
- Value Engineering



## Complete Streets



Florida Department of Transportation

800 N. WEST  
CORPORATE

405 Lawrence Street  
Tallahassee, FL 32399-0450

ANASTAS FRANKS, P.E.  
GOVERNOR

### COMPLETE STREETS

It is the goal of the Department of Transportation to implement a policy that promotes

This **Complete Streets Policy** will be integrated into the Department's internal manuals, guidelines and related documents governing the planning, design, construction and operation of transportation facilities.

- Cyclists
- Freight handlers
- Motorists
- Pedestrians
- Transit riders

System.

This **Complete Streets Policy** will be integrated into the Department's internal manuals, guidelines and related documents governing the planning, design, construction and operation of transportation facilities.



*Anastasis*  
Anastasis Prasad, P.E.  
Secretary



## Context Sensitive Solutions



... Context Sensitive Solutions is a proactive, collaborative, interdisciplinary approach to transportation decision making, project development, and implementation, taking into account, the views of stakeholders, and the local area where the project will exist, ...

Consistent with the CSS principles prescribed by the Federal Highway Administration, FDOT transportation projects and activities shall be compatible and consistent with available resources, FDOT policies, and community visions.



*Stephanie C. Kopelousos*  
Stephanie C. Kopelousos  
Secretary



## Value Engineering

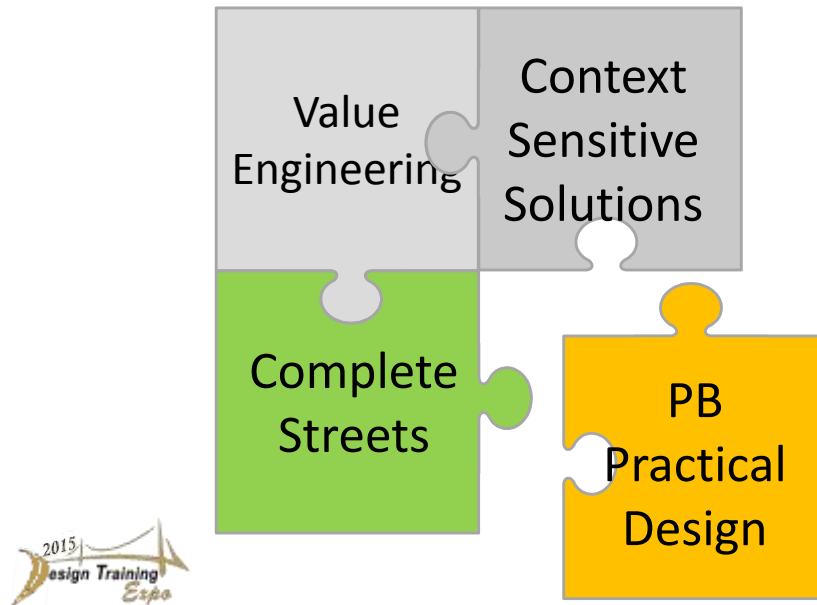
- Performed by a multi-disciplined team
- Performed on large or complex projects
- VE looks for solutions to satisfy a project's basic function at the lowest life cycle cost without compromising safety or performance, while meeting the projects goals & objectives.

**Similar philosophy**

**Purpose & Need → Basic Function**



## Integration





Thank You